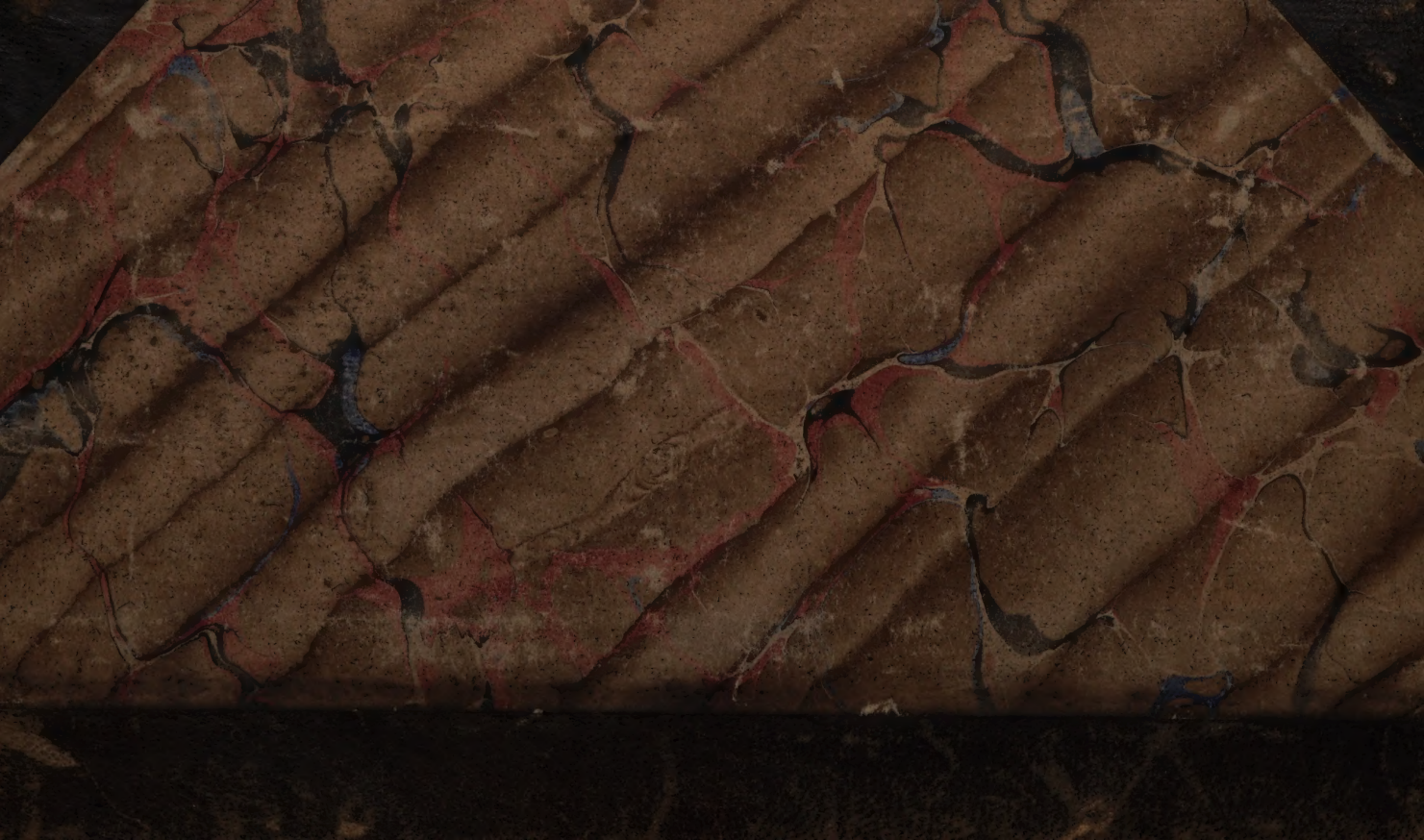

WHATELY T.

PRACTICAL

OBSERVATIONS

ON

NECROSIS OF THE TIBIA;

ILLUSTRATED

WITH CASES, AND A COPPER-PLATE.

TO WHICH IS ADDED,

A DEFENCE OF A TRACT,

ENTITLED,

" Description of an Affection of the Tibia induced by Fever," &c.

BY

THOMAS WHATELY,

MEMBER OF THE ROYAL COLLEGE OF SURGEONS IN LONDON.

" Improvement of the art of Surgery, and the relief of mankind, are my two principal objects." POTT.

London:

PRINTED FOR J. CALLOW, MEDICAL BOOKSELLER,

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1815.

TO

JOHN SIMS, M. D.

AS A

TRIBUTE OF RESPECT TO HIS LEARNING AND PROFESSIONAL ABILITIES;

AS A

TESTIMONY OF ESTEEM FOR HIS GENERAL CHARACTER;

AND AS AN

EXPRESSION OF REGARD FOR HIS FRIENDSHIP;

THIS LITTLE WORK,

IS INSCRIBED,

BY HIS SINCERE FRIEND,

THE AUTHOR.

Grafton Street,
February 23, 1815.

PRACTICAL

OBSERVATIONS

ON

NECROSIS OF THE TIBIA,

&c. &c.

ABOUT four years since, I published a small essay, describing a disease of the Tibia, generally preceded by a fever; in which I remarked, that it was a disease sui generis, and totally different from lues venerea, necrosis, or any of the affections of the bones attending scrophula. Since which it has been asserted by some, that this disease is nothing but "the necrosis ossium of surgical writers."*

* "There is a sort of mystery in the title, which is not "very creditable to the author. One would think that

The editors however of a most respectable journal, have given a very different account of this disease, in their review of the essay. The following is an extract.

" The appearances of this disease seem " to have a striking resemblance to those " of necrosis, so that the one might " easily enough be mistaken for the " other; in necrosis, while a portion of " a long bone dies, a new formation is " going on, which envelopes the old " bone, and when perfected, supplies its " place. The old bone, inclosed within " the new, is gradually decomposed and " separated; and the cure of the cor- " responding disease may often be ad- " vanced by a well-timed extraction of

" Mr. Whately was describing a new disease, and announc- " ing some new discovery of his own; but the affection is " no other than the *necrosis ossium* of surgical writers, &c. " &c."—*Critical Review for April*, 1811.

The title of the pamphlet here referred to, is, " Descrip- " tion of an Affection of the Tibia induced by Fever, with " Observations on the Treatment of this Complaint."

" the sequestra. But in the disease, to
" which our attention is now called, ac-
" cording to Mr. Whately's description,
" the sequestra, or loose pieces of bone,
" are merely exfoliations of the internal
" laminæ of the tibia. The whole shell
" of the bone is not lost, and there is
" consequently no reproduction of new
" bone, as in necrosis."

See Edinburgh Medical and Surgical Journal for July 1811.

I shall not enter into any controversy on the subject with those who have thought proper to differ with me, my only view in taking up my pen, is the promotion of science, and the good of mankind. The disease of the Tibia which I have described, being chiefly, as far as my experience goes, confined to that bone, I shall contrast it with an affection of the same bone by Necrosis, illustrated by a few cases, and an engraving of the disease: following thus the plan of the

former essay, and leaving it to a candid public to judge, whether, that which I had before described, was Necrosis, or another disease.

Mr. Russel has given us a very valuable and excellent essay on Necrosis in general; and as the Tibia is more frequently affected by this complaint, than any other bone in the human body, the reader will find considerable attention paid to this branch of the subject by that author. Different practitioners, however, may differ in their reasoning and mode of treatment of the same disease; and if this be done with fairness and candour, according to the best of their ability and judgment, posterity will reap the benefit, and in time we shall arrive at the ne plus ultra of perfection. But there can be but one true way of explaining cause and effect in diseases, and one mode of treatment must be the best; and this ought to

be preferred to any other. As far as my observation goes, Necrosis of the Tibia, is chiefly confined to patients from the age of seven or eight to fifteen, and sometimes to twenty. This accords generally with Mr. Russel, and is further corroborated by many cases on record by other writers. In the affection of the Tibia after fever, on the contrary, a majority of cases occur at the age of between thirty and forty. Mr. Russel however says, that he has never known a case, in which an attack of Necrosis of the Tibia, began after the age of twenty; but I have met with a few cases, where it occurred in adults. In proof of this I may add, that many specimens are to be seen in museums; and that instances of its attacking adults, are likewise recorded by authors.

In those cases of Necrosis on the Tibia, which have fallen under my own observation, pain has suddenly seized the

bone, without any previous indisposition whatever; (a slight injury to the part has, however, in several instances been sustained.) The pain was soon followed by an increase of heat, and swelling of the limb, attended with violent inflammation. All these symptoms have rapidly increased, and to a very alarming degree, almost always confining the patient to bed, and terminating at length, in about a fortnight, or three weeks, in a large deep seated abscess in the course of the Tibia; which has either burst, or been discharged of its contents by a lancet. This has usually been followed by four or five others, or more, at different periods afterwards; all of them for the most part situated in the course of the Tibia, or connected by sinuses with it.

An attack of Necrosis on the Tibia, is therefore an attack of inflammation, followed by suppuration, and producing

certain effects upon the bone. It will be of use to explain the action of this inflammation, and its consequences, as I do not think these points are quite so well understood as they ought to be. By an attention to the history of cases of Necrosis Tibiæ faithfully related, it would appear, that the inflammation first attacks the substance of the bone; and as in that of the soft parts, where we can more accurately trace its progress, is unquestionably more or less violent, or to a greater or less extent, in different cases; that is to say, the whole, or a part only of the Tibia, may be affected by it; thereby producing considerable variation in its consequences. It appears however, that in the greater number of cases, the disease extends over the whole of the Tibia. It may seem strange to some, that a bone so hard and solid, which appears to have so few red blood vessels

in its composition in a natural state, should be the subject of high inflammation. The fact however is certain; and it will be clearly shewn, that the whole of this bone is frequently destroyed by its action, and removed from its place in the system in a very short time.—The more accurate our ideas are on this subject, the more correct will be our mode of treatment: I shall therefore endeavour to explain myself a little more minutely. All the vessels which carry blood into the Tibia, must be excited to strong action, by which the bony laminæ are so destroyed, that nearly the whole of this hard bone, from joint to joint, is reduced *in some cases*, to a mere vascular pulp, by the absorption and annihilation of all its component parts; except only a few small particles of bone, which are detached from the circulation, and remain as extraneous bodies in different parts of the leg.

In other cases, where the attack is not more severe, nor the inflammation more extensive, and where the symptoms appear as nearly the same as possible, almost the whole cylinder of the Tibia, though frequently in a jagged and eroded state in some parts of it, perishes, is detached at each extremity, at a little distance from its connection with the epiphisis, and thrown off as an extraneous body. *In other cases* again, a portion only of the cylinder of the Tibia, accompanied by other large pieces from different parts of the bone, is left detached from the adjoining parts by the inflammation; all the remainder of the bone being absorbed. Or it *sometimes happens,* that almost the whole substance of the Tibia is absorbed or destroyed; leaving only some long thin dead laminæ, which are often found six or eight inches in length. Besides these cases, there are others, in an

almost endless variety, in the size, number, and situation, of portions of the Tibia, detached by the inflammation, and left as extraneous bodies. Among these are sometimes, portions of its cancellated structure, the remainder of the bone, being, in all these cases, as in the former, absorbed, or in some way destroyed. This variety is so great, that I have not seen two cases exactly alike, and is further exemplified, by the different appearance of morbid preparations of these parts in collections. There are yet other cases, where the attack of inflammation appears to be of the same kind as in the preceding ones; but its action is more partial, and a portion only of the entire cylinder of the Tibia, which is generally its lower part, is destroyed by it, leaving the other extremity in its natural state. These are some of the surprising changes, which are occasioned in

the Tibia in a short time, by this disease. Were it necessary, much might be said, by way of illustrating this disease, of the destructive effects of inflammation in the soft parts of the human body.

From all the observations which I have been able to make, an attack of inflammation of the Tibia in a case of Necrosis, appears to produce the entire destruction of the part attacked; partly by detaching portions of it from the circulation, and reducing them to the state of extraneous bodies, and partly by converting the remainder into a vascular pulpy mass, by the absorption of its bony laminæ; both of these effects being constantly produced to a greater or less extent of each, in every case of this disease. That this is true with respect to the bony detachments, we have ocular proof in every case which comes before us: and I presume it will be no difficult matter to

prove, that the production of pulpy mass is the constant effect of the inflammation on those parts of the bone which are not detached from the circulation. A case exemplifying in a remarkable manner the latter process, occurred to me in the early part of my practice. A portion of the Tibia being laid bare by caustic in a middle aged man, in order to expose completely a hole in it, which was known to penetrate within its cavity, a piece of bone of some length was found confined within it,* and required an enlarge-

* I have called this, (and I should hope not improperly) an internal exfoliation of the Tibia. Mr. Russel, indeed, denies the existence of this disease, and says, that what have been called internal exfoliations, are in his belief the sequestra, in cases of Necrosis. This however, was not the fact, in the present case, nor in many others which I have seen. Here a small ulcer appeared in the skin, from which a probe readily passed through the bone into its cancellated structure, where it touched the internal exfoliated piece, and which could be readily moved upwards and downwards in its bony case, by a pair of fine forceps. The Tibia all around it was in a perfectly natural and smooth state, without the least

ment of the hole in order to allow of its extraction. A trephine was applied, and a number of holes were bored in the bone with a common gimblet, around the hole in the Tibia, as the center pin could not be fixed. The saw was then worked, till it reached the cavity of the bone; but in these operations, the Tibia was found to be extremely hard, and was with difficulty penetrated to the proper depth; and the removal of the encircled piece, was attended with still greater difficulty, on account of this extreme hardness of the bone. When at length effected, the opening was found to be not yet of sufficient size, to allow of the extraction of the loose piece of bone. About seventeen days after the first operation, I applied the trephine again, and was pre-

vestige of a new cylinder, or the formation of any adventitious bone. This therefore, is one proof of the existence of a case of internal exfoliation.

pared to meet with the same difficulties I had before experienced; but to my great astonishment, the moment I had penetrated a very thin external lamina of the bone, the instrument plunged into a pulpy vascular mass, with very small portions of bony particles in its composition, and so soft, that it worked to the depth I wished in a few seconds, being interrupted only by blood in the furrows of the saw. In about eight days more, this operation was repeated on an adjoining part of the Tibia, in order to enlarge the opening still further; and excepting an external shell of the Tibia, rather thicker than at the last operation, its substance was composed of the same vascular pulpy mass, as was found at the second operation. The hole in the Tibia being now sufficiently enlarged, an exfoliated piece, two inches long, as thick as a quill, and extremely hard and strong, being a por-

tion of the internal lamina of the bone, was readily removed from its situation within the cancellated structure of the Tibia, and the patient completely cured in a short time afterwards. This remarkable change in the texture of the bone, was produced by the excitement or morbid action of its vessels, adjoining to the part where the trephine was applied, in order probably, to repair the injury done to it by that instrument. And it clearly shews, that one of the hardest bones in the body, can entirely lose its solidity in a short time; which will in some measure serve to explain, the rapid destruction of a whole Tibia in Necrosis; for though the cause exciting inflammation in these cases is different, the effect may be, and probably is, the same in both. The attack on the Tibia therefore, in a case of Necrosis, is an attack of violent inflammation, terminating in suppuration; for

large quantities of matter have been formed in and around its substance, in every case which I have seen; all tending to the more complete destruction of its structure.

I shall next endeavour to explain, why the dead or separated portions of bone in Necrosis of the Tibia, should be of such different sizes in different cases, where all the symptoms, and even the complaint itself, appeared to be nearly the same. This part of the pathology of Necrosis, is not, I apprehend, so well understood as it might be. It is a subject of some importance; and a correct and just explanation, must undoubtedly be of considerable use in the treatment of this complaint. The consequent effects of inflammation and suppuration in the soft parts of the human body, are often uniform, but we can easily understand why this uniformity should not take place in a

very hard bone. Sometimes the inflammation may pervade, at the same time, every part of the bone; gradually changing its serous, into vessels carrying red blood, by which the whole bony texture may be uniformly destroyed, its earthy particles set at liberty and absorbed, and what was a few days before so hard and impenetrable, as scarcely to be acted upon by the sharpest instrument, be now reduced to a mere soft vascular pulp, with here and there a few small bits of bone, which will afterwards become extraneous bodies. This is not given as an hypothesis, but as a plain matter of fact, that may be proved, by taking a view of those cases of Necrosis of the Tibia, where the whole cylinder of the bone is destroyed by inflammation, without leaving a vestige of it larger than the small pieces I have already mentioned. In another case of Necrosis, with exactly

the same symptoms as the one I have just described, the inflammation may be more violent in one part of the Tibia than in another; cutting off at once from the circulation, in a way unknown to us, either the whole bone, or greater or less portions of it. This explanation will shew why the dead pieces of bone in Necrosis are of such different sizes. And here a question of importance offers itself, viz. whether these bones, when once detached from the circulation, undergo a gradual decay, and consequent diminution of size, being dissolved by the heat and moisture of the part, and at length totally absorbed or discharged, in no unreasonable length of time after their separation; or whether they remain for a very long time, nearly in an unchanged state. The former opinion I believe is very common, and Mr. Russel speaks confidently of the truth of it. To ascertain this point, is of

considerable importance in practice; as the propriety of having recourse to the speedy removal of the dead pieces by art, or of leaving them to time, and the gradual operations of nature, will in many cases be materially influenced by it. From all the observations which I have been able to make, and a careful inspection of a large number of detached pieces of bones in Necrosis, taken both from living and dead subjects, and comparing these, with common exfoliations in other cases, I am convinced the truth is, that after any portion of bone, is entirely cut off from the circulation, it undergoes very little change, although exposed to continued moisture, and the uniform heat of the human body, for a great length of time. Indeed it is not easy to comprehend, how any change can be effected on it, through the medium of the circulation, from which it is now entirely cut

off. How long a dead piece of bone will lie unaltered in the situation above described, I will not pretend to assert; but I am of opinion, it will undergo very little change in many years. The inspection of different specimens of Necrosis in collections, and of the drawings of others in the works of authors, will shew, that many of them must have remained in the situation I have described, for a great length of time, without any material change having been made upon them. And a comparison of these, with other specimens of bones in this disease, which can be ascertained to have remained in the limb, only a short time after the destruction of life in them, will clearly shew, that the appearances in both cases are nearly similar. The worm-eaten, eroded, and jagged appearances of many parts of these bones, cannot be explained upon any other scientific principle, than

that such appearances, are the consequences of the action of the blood vessels, and lymphatic system upon them, while they yet possessed life. There would be no difficulty in finding two specimens of Necrosis, from the same part of the Tibia, where the disease had been very similar in both, in one of which a large portion of the bone, shall be almost in the natural state, with very little erosion, or worm-eaten appearance, except at each extremity, where the detachment took place; whilst in the other, these appearances may take place in a great degree, in every part of its substance, although each of the bones had been confined in the same state of heat and moisture, for about the same length of time. May it not then be presumed, that this great difference in appearance, depends altogether upon the diversity in the action of the vascular system upon them, while

they were living parts of the human body? And from thence it may also be inferred, that no material change would afterwards take place, from the mere effects of heat and moisture.* As a

* In the second vol. of Medical Observations and Enquiries, two cases of Necrosis are related, and drawings given of the extracted bones. In the first, from a boy thirteen years old, was taken a large portion *of the whole circumference* of the thigh bone, seven inches and a half in length, and *undisfigured*, except at its two extremities, where it was eroded. This bone had remained in the limb, two years and a half, and after its extraction, the patient recovered the perfect use of it. A short history of the other case, but of the Tibia, in a boy, seven years old, in which the leg was amputated, is related by the celebrated Dr. Wm. Hunter. The examination of the disease is given in the following words.—" I observed, that the external surface of the " inclosed and loose piece of bone, was smooth like the " natural surface of a young Tibia: not like a bony surface " that had been parted by exfoliation. In order to be " more certain of what I thought, I removed a small part of " the *surrounding bony substance*, and took out the loose " bone. It was found to be the whole body of the Tibia, and " the *prints* of the muscles, particularly of the poplitœus " and solæus, and *every other natural feature*, were visible " upon its surface. It had separated by exfoliation, (not " indeed in the etymological sense of the word) at a little " distance from its connection with the epiphysis, at each " extremity," &c. &c.

further confirmation of the truth of these remarks, it may be stated, that I have seen several cases of exfoliations of different sizes, from bones of various degrees

These two cases concur in proving the correctness of the statement I have given, of the unchangeable state of these bones, when once detached from the circulation; as there does not appear to have been the slightest alteration made upon them, by their long detention in the limbs.

I have lately seen a case of Necrosis in the lower jaw, and another of the radius, both of them in children from five to six years old.—I extracted the former, by the mouth with perfect ease, with a finger and thumb only. It was the entire half of the jaw, with some of the teeth, having only a few eroded, or worm-eaten like places in it. See Fig. 9. It was no sooner extracted, than the child strongly compressed, or bit, one of my fingers, with a new jaw already formed, and that by an action, apparently as strong, as that of the original bone; but it was without teeth.—The radius was likewise entire, with some erosion only at its upper end. This likewise came out with great ease through an ulcer near its lower end. See Fig. 10. Another radius seemed to be formed in its place. Both these specimens retain every mark of bones in a perfect state, except at the few places where they were eroded by the inflammation preceding their destruction; their peculiar eminences and depressions, the places for the entrance of nerves and blood vessels, with the smooth and natural surface of both of them, shew, that these bones had not undergone the least alteration or dissolution, since they became dead and extraneous bodies.

of hardness, the consequence of disease not belonging to Necrosis, which, after remaining in their situation, and of course exposed to the absorbents, and to the heat and moisture of the human body, for many months, and even years, have been apparently unaltered in size or firmness, from the state they were in when first detached from the circulation. And in cases of Necrosis, as well as in other diseases, I have repeatedly extracted pieces, even of the delicate cancellated structure of bones, which had been confined in the situation I have described, for several months, without having undergone any apparent alteration of size, or structure, from the time of their exfoliation. I have also lately seen a case of the affection of the Tibia after fever, of eleven years standing, in which, the exfoliated piece, though not more than a quarter of an inch long, had evidently remained in

its situation within the cavity of the Tibia, during all that time, without having undergone any apparent alteration. And within the last three years, I have extracted a very thin scale or exfoliation from one of the ribs, which had been known to have been detached from the living bone, more than six years without having undergone the least decay. And just as this essay was going to the press, I was told of a case, where a piece of bone had been extracted from the thigh, after having remained in the part eleven years, having been detached at that period, from the living bone, by a gun-shot wound. I do not mean however to assert, that no alteration whatever, or that no loss of weight, or diminution of substance, ever takes place in exfoliated or detached bones, under any circumstance of time and situation. All that I mean to say is, that in hard bones, this

loss must be very trifling, and that the chief dissolution and loss of substance, with the ragged appearance, of bones attacked by Necrosis, always takes place, through the medium of the circulation, while the bones are alive, and not after their separation, or when they have become extraneous bodies.

Having thus endeavoured to shew, that Necrosis of the Tibia is an attack of inflammation, by which the bone is either partially or wholly destroyed; I shall next give a short statement of the method which nature takes to repair the injury done by this disease. The Tibia, or other bone, is no sooner destroyed by the inflammation, than a process is set on foot for the erection of another fabric; equal in strength, if not in beauty, and fit for all the important offices of the former. A new Tibia is formed; not indeed in the exact place of the former;

for it cannot be supposed, that the two processes of dissolution and regeneration, should be going on, precisely at the same point, and at the same time. The new Tibia, is however, formed as near as possible to the old one. If the whole bone be destroyed, the new formation appears to envelope it on all sides, from one extremity to the other; but when the bone is only partially destroyed, the process of regeneration joins the old bone to the new one, above and below the seat of the disease; much in the same manner, if we may judge by preparations, as the callus in a fracture, is incorporated with the contiguous ends of the sound bone. That in many cases of Necrosis of the Tibia, the new-formed bone surrounds and envelopes the old, with a bony case, is certain. This complete imprisonment, however, does not always take place; on the con-

trary, there is very often no imprisonment at all of the main cylinder of the bone; but only very small detached particles of it are partially surrounded; the remainder being reduced to a mere vascular pulp, by the absorption of its bony particles. This difference takes place in those cases where the disease was apparently the same in all its symptoms. In other cases, a portion of the cylinder of the Tibia, or detached parts of it, of different sizes, are imprisoned; and these are seldom completely surrounded on all sides by the new bone. Such varieties I have already endeavoured to explain, from a difference in the action of the inflammation at the first attack of the disease. When the whole bone is destroyed, and completely cased by the new, forming what is called a sequestra, several openings, frequently of a circular form, are left in different parts of the

new bone, to allow of the discharge of the pus, constantly produced by the irritation of this unwelcome inmate.*

* I apprehend an opinion at present too generally prevails, that in cases of Necrosis of the Tibia, frequently, if not usually, almost the entire cylinder of the old bone, is imprisoned by the new cylinder formed over it. I believe, however, that this occurrence is more rare than is represented by authors. Out of ten cases, which have occurred in my own practice within the last five years, not one of them was of this kind, nor has any operation been hitherto necessary in any of them, except the extraction of the dead pieces of bone detached from the circulation by the forceps only, through the ulcerated holes left by the disease, without the removal of any part of the new cylinder, or even of integument, and generally without any enlargement of the ulcerated holes by sponge tent. I recollect also to have formerly seen many similar cases of this disease, which were cured by the same method. In young people, in particular, I have very rarely seen the formation of a complete imprisoned sequestra of the old bone. Cases of cures of this disease by nature, where the detachments of dead bone were few and of small size, and of others, where such bones have been extracted by the forceps, or other simple means, have been rarely recorded:—The worst cases only having been thought worthy of publication, whether they have been cured by any operation for removing the sequestra, and preserving the limb, or by amputation. Specimens also of the worst kinds of this disease, procured by amputation, or taken out by the forceps, or other methods, or taken from patients after death, have been accumulated in

Sometimes however, almost the entire cylinder of the Tibia, is completely detached at each extremity, as in the former case; and yet a considerable portion of its internal side, especially

museums for a very long time; all of which may have contributed to the opinion, that this form of the disease was more prevalent than any other. My own observations however, would lead me to conclude, that the reverse of this was the truth. And if this disease most generally attacks very young people, which happens from what I have seen in nineteen cases out of twenty, it might be supposed, that specimens of bad cases in young subjects would occur in the same kind of proportion in museums. But from a late inspection of several of the most valuable collections in town, I apprehend that the proportion is the reverse of this.

Perhaps this disease in adults, although much more rare, is more dangerous, and as the Tibia in them, is harder than in young people, larger portions of it may be more frequently cut off from the circulation, by the inflammation; consequently, it may be more frequently enveloped as a large sequestra. From the greater difficulty of extracting these, than small sequestra, added to the greater danger to the constitution from this tremendous disease, in bad cases, patients of this description, would more frequently submit to amputation, than young people. I apprehend too that a greater number of them, if left to nature, would die; hence, in course of time, a larger number of specimens from adults, of *beautiful Necrosis*, as they are called, would be added to museums, than of those from young subjects.

towards the upper part, is not surrounded by the new cylinder; although it may be partially covered by integument. In other cases, irregular arches of new bone are thrown over it at different parts. Indeed the greatest variety occurs, in the degree of envelopement, by the new cylinder; but the external and posterior sides of the old Tibia, are generally more completely surrounded by it, than the internal side. The reason of this probably is, that the internal side has no other covering but integument, and much of this is often destroyed and ulcerated by the previous inflammation and suppuration, which diminishes or destroys the proper nidus for the new osseous matter. To the same effect, also, the constant flow of matter from the old Tibia, which generally takes place from the anterior part of it, may perhaps contribute.

It has been before observed, that in

cases of Necrosis of the Tibia, where the greater part of the cylinder of the bone is destroyed by inflammation and absorption, small detached portions of it are generally left in different parts of the leg; these are for the most part, partially covered by the new cylinder, and each has an ulcerated outlet for the discharge of the pus. When the portion of the old cylinder detached by the disease is large, and the covering of the new Tibia is wanting, or imperfect at its internal side, those portions which form on its external and posterior sides, press on the old cylinder, in endeavouring to occupy its place, and becoming, by time, harder and harder, raise it by degrees out of its natural situation, and leave it higher than the adjoining integument. I have seen this case occur several times. It is an effort of nature, to rid the part of an useless dead bone, and to supply its place with a

new one, of sufficient strength. Where large portions of the Tibia are removed from the limb, either by the processes of nature, or by art, a flatness or hollow is often left in the part, from whence they were extracted, which, combined with irregular deposits of the new bone, in the parts adjoining to it, produces an unsightly and clumsy appearance, somewhat different from that usually met with in cases of Necrosis. Mr. Russel has justly noticed this clumsy appearance in the legs of those who have been cured of Necrosis. It takes place in every case of this disease, as well in those cases, where nearly the whole Tibia is destroyed by inflammation and absorption, as in those, where the entire cylinder becomes dead, and is removed by art from its situation.* All this proves, in my opinion,

* I believe it will be found, that by absorption from the action of the muscles, and other causes, the clumsy appear-

that the depositions of new bone are always external to the old, and not formed in the place previously occupied by it. So that the process of regeneration is going on during the very time, in which the old bone is undergoing its destruction. This is wisely ordered; as a fresh solid pillar is thereby preparing for the support of the body. It would appear, however, that when the cure is complete, the place before occupied by the old bone, is filled up by bony matter, which, with the new formed covering, is consolidated into an extremely hard and compact mass, as may be seen in preparations; and this takes place, both when the Tibia is removed entire, after becoming a sequestra, and when the bulk of it is taken up by absorption. In all violent cases of Necrosis, many weeks, and in some

ance in all cases of Necrosis, will in time become more sightly, and the limb be reduced into less compass.

cases, many months elapse, before the patient is able to bear the whole weight of the body on the limb; indeed the pain and inflammation are at first so violent, that he is generally unable to sit up for several weeks, or to retain the limb, even for a short time, in a dependant position.

Thus far have I given an account of Necrosis of the Tibia, according to the best of my judgment; I shall next proceed to offer a few practical remarks on its treatment. On the first attack of the complaint, recourse should be immediately had to every means of lessening, or if possible, of removing the inflammation; by bleeding from the arm, if the patient's strength will admit of it, by the application of leeches to the part, by purging, by a low diet, and externally, by means of fomentations and emollient poultices. To these should be added, a strict horizontal position, and when the pain

is extreme, occasional doses of laudanum. This plan will, however, I believe, seldom arrest the progress of the disease; but if it tend to lessen the violence of the inflammation and pain, and to confine the mischief within smaller limits, it will be desirable. If, notwithstanding, the disease should terminate in suppuration, the antiphlogistic plan should not now be pursued to the same extent as before; and if the pus is not freely discharged by the natural openings, it should be let out by a lancet, wherever it is required. As soon as the fever is sufficiently abated, the strength should be supported by the bark, and a small quantity of wine or beer. The emollient poultices should be continued, as well as the laudanum, as long as they may be necessary; and while the symptoms continue violent, the limb should not on any account be removed from a horizontal position. Our chief attention

at this period of the complaint, should be directed to the prevention of any lodgement of matter. For this purpose openings must be made to allow of its free discharge, and the dressings should be removed, at least twice in the twenty-four hours. The disease must be carefully watched, with a view of ascertaining the effects produced on the old bone; whether this is likely to be absorbed, leaving only here and there small detached bits of it, or whether it is likely to be cut off from the circulation, and become a sequestra of its whole cylinder, or of a greater or less portion of it, or what other variety of this disease may have taken place. If the first of these effects appear, perseverance in the same treatment will be all that is required, until the patient shall be able to get out of bed. As soon as he has recovered sufficient strength, the pieces of bone should be extracted by the

forceps; enlarging the openings where it may be necessary by sponge tent; after which, a complete cure will ensue. But if any of the latter effects take place, the utmost attention should be paid, and as early as possible, to the removal of the dead bones. This is, however, a nice, and often a difficult task, and will, in many instances require skill and manual dexterity, as well as length of time to accomplish. As soon as any portion of the bone, greater or less, is found to be completely separated, which in most cases is known by its becoming moveable, it should be extracted, if the patient's strength will admit of it, and it can be done with safety. There are two principal advantages attending this mode of procedure, viz. the new or adventitious bone will be softer, and therefore more easily acted upon by any instrument that may be necessary, should it occasion any impedi-

ment to the removal of a sequestra; and at this period of the complaint, it will embrace or hem in the sequestra in a less complete and firm manner. The irritation occasioned to the constitution as well as to the part, by the presence of a foreign body, will likewise be the more speedily removed, and the recovery of course much expedited. When the whole cylinder of the dead Tibia becomes surrounded by the new bone, forming a complete sequestra, and no portion of it is protruded through a vacancy in the new cylinder, more skill and address will be required to remove it, by an operation, than in any of the other varieties of this disease. As, however, two cases are seldom exactly alike, each may require some difference in the mode of operation. The operation for removing the sequestra, should be performed at that part of the new cylinder, where the openings in it are

the largest, and afford the greatest probability of allowing an enlargement of them to be made of sufficient size for its removal. It is not my intention to enter into a minute detail on this part of the subject; these processes being well described by Mr. Russel. Let it suffice to say, that the common integument should be removed or divided, where necessary, and openings through the new bone should be made by the knife, trephine, or chissel and mallet, as the different circumstances of the case may require. The latter implements, however, should be avoided as much as possible, though they may be necessary where the new bone is become extremely hard. Mr. Russel's remarks on this subject are worthy of observation. Where the detached cylinder of the old bone is complete only at one extremity, which is generally its upper end; and the other

part of it is in a jagged eroded state, the new bone not so completely enveloping it, but that a fissure or opening is left, through which one end of the cylinder protrudes, of sufficient size to extract the whole, we must of course spare the patient the pain of any operation, excepting that of extraction by the forceps, and even this must be done with great care and judgment.

In all cases of Necrosis where a sequestra takes place, there is a thin intermediate substance, of a pulpy or granulated nature, between the old and new bones; for although they approximate, they are not actually in contact; but are so nearly so, that in many instances, the sequestra possesses very little motion. It is therefore generally the best practice, to extract the sequestra with forceps or strong pincers, without waiting for its being very loose, as is

necessary in some exfoliations. Sometimes an impediment to the extraction may be occasioned by a partial covering, or arch of the new formed bone. When this happens, the part that obstructs the extraction of the sequestra, must of course be removed by a suitable instrument. In many cases, besides the large pieces of the cylinder of the Tibia which I have described, there are smaller pieces detached from the sides of the Tibia, at different parts of it. These lie at different depths, and are enveloped, like the large piece of the cylinder, by a partial covering of the new bone, or sometimes only by the common integument. The outlet through which the matter is discharged, is, for the most part, of sufficient size to admit of the extraction of these pieces through it; and by a judicious application of the forceps, moving them from side to side,

I have generally succeeded in extracting them, without removing any part of the new formed bone, or even of the integument: In this manner I have sometimes extracted twenty or thirty pieces of bone; but sometimes the sponge tent* must be used to enlarge the opening in the integument; and when necessary, portions of the new bone must be removed. In those varieties of this disease, where nearly the whole substance of the bone has been absorbed, leaving only a long thin light shell of the internal or external side of the Tibia, or of both united, with its spine, (See Figures 7 and 8) which is not uncommon, we must extract as before by the forceps; which may in general be readily accomplished by attending to the directions already given.

* Sponge tent, made by dipping sponge in strong gum water, and afterwards tying it with a strong pressure, between two pieces of narrow wood, till dry, is superior to that in common use.

It is obvious, therefore, that the complete cure of all these varieties of this disease, consists in the removal of the different pieces of dead bone. Nature indeed will make great efforts, as in most other cases, to rid herself of these irritating bodies; and, with the assistance of time, much may certainly be expected from her: but that excellent surgeon, Pott, observes, "It is the business of "good Surgery to assist nature." I am therefore convinced, that in these cases, more assistance may be given to her, than in most others. Too much in general is left to nature; for these bones being usually more or less wedged in by the surrounding new cylinder, and withal covered pretty closely by common integument, nature cannot easily rid herself of enemies thus situated. It may happen indeed, that in length of time, many of these pieces of bone will work out,

as the phrase is, as I have often seen; but more may be done by art, in a few weeks, than nature unassisted, will be able to accomplish in as many years. How absurd, then, in such cases, is the practice of waiting nature's time, and of refusing to give her that assistance from art, which is required. For during such delay, an irritation and discharge is constantly kept up; the patient is deprived of free exercise; the limb becomes more deformed; and if the portions of dead bone are large, a hectic fever may be brought on, and so much mischief done to the constitution by the length of suffering, that death may ensue. When these pieces of bone happen to lie very superficial, they are of course readily taken out; but those which are situated deeper, are often uncommonly difficult to extract. I have known many of them lie to the depth of from two to three

inches; in which situation they had remained for years. Yet even these have been commonly removed by careful extraction with the forceps, without any previous enlargement of the opening in the integument. At the same time I am persuaded, that had they been left to themselves, they would neither have worked out, nor have been dissolved for many years to come. Previous to the application of the forceps, a probe should be passed to a sufficient depth, to find two sides of each piece to be extracted, in order that the operator may be enabled to fix them securely, and advantageously. When the fragments of bone are numerous, it is best to extract such part only at one time, as the patient can easily bear; and to apply an emollient poultice to the parts after each operation.

When all the dead pieces of bone are removed, much attention will still be

required, to heal the wounds; which is not unfrequently difficult, from the bad constitution of patients afflicted with this disease, especially in those who reside in town. Now and then it happens, that the wounds heal readily after the bones are all extracted; at other times, they remain stationary for some time, or even enlarge, and spread for a few weeks, and then heal. When the limb is in an inflamed and painful state, whether the ulcers are spreading or not, an emollient poultice of bread and milk, with hog's lard, renewed twice a day, is the best application; previously covering each wound, either with a small bit of dry lint, or a plaster of hog's lard; and lastly, enveloping the whole limb, from the toes to the knee, in a light but equal manner, with a flannel roller,*

* The gentle and equal pressure of a roller, over a poultice, when the former is applied from the toes to the knee, is

six yards long and four inches wide. After the painful or spreading state has completely ceased, the poultice should be left off; continuing the same dressing upon a larger piece of lint, with the addition of two or three compresses of folded linen rag, each of them a little larger than the preceding one, and then applying the roller as before, but a little tighter. While the sores are in a painful or spreading state, the horizontal position and rest, should be enjoined as much as possible; but when those symptoms have ceased, the wounds will heal much quicker, and be much more likely to remain well, if the patient take his usual exercise; provided proper attention be paid to the compresses and bandage. In some of these cases, however, the wounds cannot be completely healed

extremely useful in various other complaints of the leg, where confinement to the bed is not necessary.

by the continuance of greasy applications. When this happens, pieces of lint, or soft doubled rag, should be applied three or four times a day, both to the wounds and skin around them, dipt in a mixture of equal parts of sugar of lead, of vitriolated zinc, and prepared calamine in water, in about the proportion of a drachm of each to a quart of water; applying the roller as before. In some cases, I have found a dose of bark, taken two or three times a day, to be of service; in others, the sarsaparilla, or cicuta, is useful. A residence in the country, and especially near the sea, will be often found very serviceable to those, who have mostly resided in large towns; and will tend very much in assisting to heal the sores. After the wounds are all cicatrized, the bandage should be continued for several months.

To these remarks, I have subjoined a few cases of genuine Necrosis of the Tibia, faithfully related, some of which are now under treatment, and some are among the worst of the kind; the patients having been in considerable danger of their lives, as well as of the loss of their limbs; all of them, however, are now useful members of society, and either have, or will have, the perfect use of their limbs. These cases will afford an useful comparison of this disease, with those of the affection of the Tibia after fever, described in the former essay. I have also subjoined a drawing of some of the legs, and of the bones extracted in many of these cases: the clumsy appearance of the former, may be usefully compared with the plate on the affection of the Tibia after fever.

It may not, perhaps, be now useless to solicit the attention of the reader, to

a few remarks on these two complaints. After the preceding observations, I think I am warranted in repeating, that the disease of the Tibia following fever, is distinct from Necrosis: it is also of rarer occurrence. Since the essay on the former subject was published in 1810, I have only met with five additional cases of it; two of which were sent to me in consequence of the publication of that essay. All of them had the same prominent features in their history as those before described, and were cured by the same mode of treatment. I am therefore still of the opinion I before gave, that the affection of the Tibia after fever, does not very frequently occur, though the contrary has been asserted. In corroboration of this, I may mention, that within the last two years, I have seen only one case of this complaint, although seven or

eight of genuine Necrosis, have occurred within the same period.

Some gentlemen have thought it very singular, that fever should precede the affection of the Tibia; and have doubted, whether it was proper fever. For my own part, I never had the least doubt on this point; the patients and their relatives having been so uniform in their relation of the history of this complaint, as to prevent the possibility of mistake. Since these objections were made, I have been more particular in endeavouring to find out, of what kind these fevers were; and from all that I can collect, not having seen any of them myself, they appear to have been generally long fevers of the typhus kind; varying, as I suppose most of these complaints do, in their duration, and in some other particulars. I now know several medical gentlemen in town who have attended in some of these cases,

and can testify to the truth of these assertions; and if any are still dissatisfied, others also might be found, who have attended some of the patients, whose addresses are given in the former essay. To me it has appeared very extraordinary, that a patient, having had a fever, should in consequence be attacked with a complaint in the Tibia. And this is what I shall not attempt to explain; it being as mysterious to me as to any one; and shall only, with a sensible writer, observe, "that one grain of matter of "fact, is worth a pound of reasoning." What I have already asserted in the former essay, I know to be correct, and that it will stand the test of ages, viz. that the affection of the Tibia which I have described, attended with one or more small holes penetrating its cavity, and a little internal exfoliation of its inner laminæ, is in almost every instance, pre-

ceded by a fever, and that generally of a violent kind.

Before I close this essay, it may not be amiss to take some notice of the objections which have been made to the mode of cure, which I have recommended, for the affection of the Tibia after fever. It is not, however, my intention to enter into a controversy upon this or any other point, as my only wish is to discuss fairly, and to find out, if possible, the best method of treating this complaint. Those gentlemen who have mistaken the disease I have described for Necrosis, have of course considered, that it ought to be treated as such. They have therefore condemned me for adopting the slow, and as they suppose, tedious method of cure by caustic; and have recommended the knife, with the trephine, the chisel and mallet, and such like instruments, as are some-

times very properly used in the cure of real Necrosis. Others, who have not directly asserted, that the disease was Necrosis, have nevertheless condemned my mode of treatment, and preferred the plan of cure, proper for Necrosis. I would, however, ask, whether any one of these gentlemen have seen the disease I have described? It appears highly probable that they have not; or, at least, that they have not adverted to its difference from Necrosis, as I apprehend it has not been before described by any author. Surely, then, such gentlemen are not qualified to judge of the propriety of the plan of cure of a disease, which they have never seen; or have mistaken for another disease; and therefore ought not to condemn in toto, a plan confirmed by so many cases, in which the treatment recommended has been uncommonly successful. It is of great importance to

science, to clear up these points, and to ascertain which is the best mode of treating the disease in question. I shall therefore endeavour to shew, that the mode of treatment, which I have recommended, is in every respect superior to any other yet known. In the greater number of these cases, it is absolutely necessary, to expose the bone around the hole penetrating the cavity of the Tibia, with the view of examining more nicely the state of the disease. For this purpose, I have invariably used the kali purum, which answers the purpose perfectly well. When this is done, the same application serves the further purpose of enlarging the hole in the bone, in order to get out the bit of bone, imprisoned within the cancelli, without having recourse to any other operation; for that part of the Tibia, in which the life is destroyed by the application of the caustic, is thrown

off by the process of exfoliation, and the hole thereby so much enlarged, as usually to set at liberty the imprisoned piece. But some have wondered, why I should not prefer the more expeditious method, (as they call it) of cutting away the integuments with a knife, then scraping the bone, and afterwards with a mallet and chisel, or with a trephine, cutting away the piece of the Tibia around the hole. But it is almost certain, that these gentlemen, as I have before observed, have never seen this disease, and of course have not performed these operations. They cannot, therefore, be aware of the advantages, or disadvantages, attending either the one, or the other method. I have now followed the plan which I have here laid down, in a considerable number of cases, for these last fifteen years, and I am convinced, it is less painful, less terrifying, more

expeditious, and more certain, than any of the others. In all the cases, which I have related, which are nearly the whole that I have seen, I have scarcely ever had occasion to resort to any other method. In the former essay, I have already advised the use of the trephine, if any case should happen to occur, where the sequestra was too large, to be extracted through the opening made by the exfoliation of the bone, by caustic. Those gentlemen who oppose the method I have recommended, do not go practically into the subject of the treatment of this complaint; nor do they follow the processes of nature, or endeavour to find out what assistance she will lend them. On the contrary, they precipitately advise the cutting of an exceedingly hard bone; thinking, perhaps, they can extract an imprisoned piece from within its cavity, as readily as they can let out matter from

an abscess by a lancet, or cut out a needle, or other foreign body, from beneath the common integument. In opposition to this, I maintain, that the first part of the process of cure which I have recommended, viz. that of exposing the surface of the Tibia by caustic, is preferable to that of doing it by the knife and rugine. Was the question about a part covered by a thick layer of muscle and integument, I should not then hesitate a moment in preferring the knife; that however, not being the case, and these parts being readily and safely destroyed by caustic, to any required extent, it is certainly the preferable operation. We are obliged indeed, to wait a few days for the separation of the slough; and now and then a repetition of caustic is necessary, where it may not have exposed the surface of the bone to the extent we wished; but the repe-

tition is attended with very little pain, as it is scarcely ever necessary to destroy any more of the skin, (from whence the pain chiefly arises) and as the patient is not confined during the separation of the slough, no material inconvenience can arise from the time required for that process.

Respecting also the different methods of enlarging the opening into the cavity of the Tibia, in order to set at liberty the little imprisoned piece, I must here again give a decided preference to the caustic, to that of the trephine, or the mallet and chisel. Let us for a moment examine the merits of each of these methods. When the surface of the Tibia around the hole, is exposed, either by the caustic or the scalpel, the bone is in its natural hard state; for in these cases, I have not seen a single instance, where there has been a new covering of adven-

titious bone, or a new cylinder over any part of the Tibia, as in Necrosis.* Nor has there been any alteration in the natural appearance of the Tibia; excepting in some cases, a little roughness and inequality on its surface, for a short distance around the hole; occasioned, no doubt, by the inflammatory action on the parts, when the matter burst from within the cavity of the bone. The natural hardness of the Tibia being therefore very great, it is with difficulty penetrated by any instrument. If we attempt to cut it by the chisel and mallet, it is not easy to cut out a piece to the depth of the cavity of the bone; unless we proceed upon the plan of cutting it, as from a dead log on a carpenter's bench. We are to keep in view, that we are operating upon a living

*. This circumstance, among others, proves, that this disease is not Necrosis, as some have ignorantly asserted.

subject, upon a fellow creature, who is alive to every blow, and if these blows are severe, which they inevitably must be, to answer the purpose, they must shake every joint in the body, before the intended purpose can be effected. We must also remember, that the Tibia in its natural state, is generally much harder than the new formed bone covering a sequestra, in cases of Necrosis, and especially if the operation in this latter disease, is performed before this bone acquires its perfect hardness. In order to strengthen my objections to the chisel and mallet, let us for a moment advert to what Mr. Russel says, on this subject.

" After all the superficial parts are " removed, the next step is to cut out " a portion of the new formed bone, " and when this is still in a soft state, " the whole of the operation may be " performed by means of a common

" scalpel, provided it be strong, and of
" a large size, because the stratum of
" new bone, previous to its complete
" ossification and consolidation, admits
" of being cut with a sharp knife. This,
" however, is but rarely the case at that
" period of the disease, when an ope-
" ration is requisite for the removal
" of the sequestra; for by this time
" the ossification of the new shell,
" is in general so complete, and every
" part of it so firmly consolidated, that
" no instrument makes any impres-
" sion upon it, which is not capable
" of cutting through a hard, solid and
" thick bone. A saw of some kind,
" therefore, is commonly requisite to
" complete the operation; which may
" be performed in two different ways.
" The operator may either make a num-
" ber of different perforations with the
" head of a trepan, placing them in con-

" tact with each other, so as to form one
" continuous opening; or he may make a
" deep incision at the top and bottom
" of the bone, by means of a circular
" saw, and then cut out the interven-
" ing portion, by the use of a gouge
" and mallet. The last method is the
" most expeditious. But it is not equally
" well adapted to every case of Necrosis;
" for when the bone is thick and hard,
" the gouge does not easily cut through
" so firm and solid a substance. Accord-
" ingly cases have actually occurred,
" in which it was scarcely possible to
" complete the operation, by means of
" these instruments. It likewise exposes
" the operator to greater risk of cutting
" out more of the bone than is abso-
" lutely necessary, and thereby making
" an opening, and leaving a sore of
" superfluous extent. No person, there-
" fore, would wish to employ this method

" of operating, when the bone is very " thick and firm, and the size of the " sequestra unknown; so that the advan- " tage of expedition is fully compensated " by other less favourable circumstances." *Russel on Necrosis,* p. 155.

I shall next consider with what success the trephine may be used to enlarge the opening in the Tibia. With this instrument we are much more likely to succeed in enlarging this aperture in the bone, and with less pain, than with the chisel and mallet; but there are some striking objections, even to this method. If we apply the saw around the hole in the Tibia, it cannot in any reasonable time be made to act, unless a number of holes are bored with a gimblet, or such like instrument, in a circular form, so as to make a groove for the saw, as the center pin cannot be fixed on account of the hole in the bone. Supposing then, we

have penetrated to the proper depth, by first boring holes with a gimblet, will the encircled piece immediately come away? By no means. It will in general be still very firmly fixed in its situation. Let any one make a section of a sound Tibia longitudinally, divide it equally into two parts, and examine its cancellated structure, and the thickness of its sides: Let him then compare the size of its cavity, and the thickness of its different sides, with the size, even of the smallest trephine; or let him first work on this bone, to the depth of the cancellated structure, with the trephine, and then divide it longitudinally. In either case he will find that the encircled piece will be very fast, owing to the natural cavity of the Tibia, being much smaller than the piece encircled by the saw. For the cavity of the Tibia is much smaller, and its sides much thicker,

through the whole length of its middle part, (which is more usually the seat of this disease) than at either extremity; the saw of course, is less likely to set at liberty the encircled piece. In operating therefore on the living subject, the same difficulty would occur, even where the hole produced by the fever, is in the middle of the internal side of the Tibia; and where this hole approaches nearer, either to the spine, or the opposite edge of its posterior side, which is frequently the case, the difficulty of extracting the encircled piece would be still greater. If therefore, we use the trephine in these cases, with the view of enlarging the opening in the bone, we shall be obliged to chisel away the encircled piece; which will be an operation, attended with the disagreeable effects I have already stated; though certainly, it would not be quite so diffi-

cult, as if the trephine had not been previously applied.* When the encircled piece is all chiseled away, if the case prove to be one of those, where the internal exfoliated piece is larger than the hole, even when thus enlarged by the trephine, we must repeat the operation by that instrument; again chiseling away the new encircled piece, which will be still more difficult than at the first time, as this piece will be the firmer for not having the hole in the bone; and should it happen that the integuments were not removed to a sufficient extent, when the scalpel was first used, that instrument must likewise be again used

* The trephine is much more likely to set at liberty its encircled piece without chiseling, in cases of real Necrosis, than in the affection of the Tibia after fever; as in the former cases, the new cylinder is much larger than the Tibia, in its natural state. This affords me an additional proof, that those who have so freely condemned the mode of cure I have advised, and substituted the mallet and chisel, and trephine, as the fittest instruments, have never seen the disease in question.

to remove them. Some of these difficulties I have met with, in operating with the trephine, in a case of the affection of the Tibia after fever.*

Having thus explained the difficulties attending the enlargement of the aperture in the Tibia, by the mallet and chisel, as well as by the trephine; let us next compare them with that of doing it by caustic. Hereby, I trust, it will be clearly shewn, which of them ought to be preferred. I have already endeavoured to shew, that the method of exposing the surface of the Tibia by caustic, is preferable to any other. By doing this, we have not only performed the first part of the operation, towards the enlargement of the hole, but we have actually almost performed the second part of it; for the very exposure of the bone by caustic, is in reality the

* See page 12, and following.

second part of the operation, according to my mode of treatment. The consequence of destroying life in any part of a bone, is the consequent separation by exfoliation of the dead from the living part; and the thickness of the exfoliated piece, is in proportion to the injury done to the bone. I have, therefore, directed, that the surface of the Tibia around the aperture in the bone, already exposed by the caustic, should have a fresh application of it, in order to destroy the life of the bone to as great a depth as possible; thereby securing an enlargement of the hole in the Tibia, when the dead part exfoliates; as the quantity of caustic, which first exposed the surface of the bone, would not in general, be sufficient to produce an exfoliation of sufficient depth for this purpose. When this is done, (which is attended with no pain whatever, nor

with any loss of time) the whole of the second part of the operation is performed. Nature does the rest without any pain or trouble. By waiting her efforts, a beautiful process follows; a considerable exfoliation takes place, which enlarges the hole so much, as generally to set at liberty the imprisoned bone;* there-

* Eight drawings of these exfoliations, are given in the plate annexed to the former essay. In several of these, the internal exfoliated pieces are represented beneath them, as having been set at liberty.

In the valuable museum at the Royal College of Surgeons, there is an unique specimen of an exfoliation from the Tibia, with a circular hole in its center; extremely similar to some of those, which I have represented in the plate of the former essay. This case bears very strong marks of having been one of those, which are the subject of my former essay. What inclines me to adopt this opinion, is, that Mr. Cliffe, Conservator of the Museum, remembers to have seen a small loose bit of bone, tied to its internal surface, where there is a groove to receive it, similar to several specimens of mine, as if this was the internal exfoliation attending such cases; but this piece is now, unfortunately lost, though the string remains. The whole of this exfoliation, is evidently a part of the original Tibia, and has no new formed bone about it. This curious bone, was in the museum of that most excellent surgeon, the late Mr. John Hunter, in whose

by effecting a complete cure without any further difficulty, and all this is accomplished, without using the knife, mallet and chisel, or saw. Some gentlemen, however, have stated, that the cure by this method is tedious, as we must wait till the slough of the bone is separated, a period generally of three weeks or a month, from the application of caustic. These objectors seem, however, to have forgotten, that a delay in the cure, nearly of the same length of time, would take place, after following their own method, by the knife, chisel and mallet, or trephine. For even supposing by these methods, they should succeed in removing the internal exfoliation at the first operation, which, according to the statement I have just given, is not always certain; it is evident, that some exfolia-

catalogue, it is simply called, an exfoliation from the Tibia, but by what means it was exfoliated is not known.

tions, from the sound bone, adjoining to the parts injured by these operations, must take place in every operation thus performed; and that the wound cannot be healed until these have taken place. If therefore, three weeks or a month be required, for the separation of a piece of the Tibia destroyed by caustic, the same length of time will be required for the separation of pieces destroyed by instruments; and in each case, the complete cure will be effected, nearly in the same time; allowing only, according to my method, for the loss of about a week in the separation of the slough from the integument, previous to the application of caustic to the bone; for the wound in the integument in neither case will heal, till every particle of dead bone be removed from beneath it. I am, therefore, clearly of opinion, that the method of cure in most, or all of these cases by caustic

alone, is in all respects, superior to any other yet discovered.

CASES, &c.

CASE 1.

ALEXANDER Mackintosh, aged fifteen, at No. 18, Tabernacle Walk, Moorfields, having had no blow, or previous fever, was seized in 1803, with pain (while walking) in the ancle of his left leg, which obliged him to rest before he got home: the pain was soon followed by swelling and inflammation, and confined him altogether to his bed on the second day, and he was unable to sit up, even in a chair, for five weeks. All these symptoms increased to an alarming degree; the pain being constant night

and day. In three weeks a large suppuration took place in the small of the leg. This was opened, and about a quart of matter discharged; after which, the pain became easier. In the course of about three months, five other different abscesses burst upon the Tibia, within two or three inches of the first ulcer, some of them above, and some below it. After this, he became much easier. Four months after the first abscess was opened, a piece of bone, an inch long, came out of the first wound. About fifteen other pieces came out at different times from the other wounds, within the space of six years. No attempts had been made to extract them, as he was told, they would work out of their own accord. At this period of the complaint I first saw him. Some of the wounds were still open, which I examined with a probe, and found several

pieces of bone, confined within them. I extracted, at different times, seven pieces; three of which were an inch in length, and all had the appearance of having been recently separated from the living bone. They are extremely hard, and the broadest piece is so strong, though not more than an eighth of an inch in thickness, that I believe it is almost impossible for the strongest man to break it with the united powers of both hands, without assistance from some other means. This piece too, being part of the external lamina of the Tibia, still retains the smooth shining appearance of that part, as perfectly, as if it was just taken from a sound Tibia. These bones had evidently been confined in their situation more than six years; and as no decay whatever, appears to have taken place, they probably would have remained in the same situation

of heat and moisture for a very long time, without undergoing perfect decay.* These bones, therefore, furnish one of the best proofs I have to give, of the

* I can readily suppose that a piece of bone confined in any part of a living body, will be kept from putrefaction and decay, for a much longer time, than a similar piece, kept in the same degree of heat in a common dunghill. Many reasons might be assigned for this opinion. Among others, it is probable, that, as such a piece would be constantly surrounded by granulations, which are perfectly free from fœtor, in consequence of the constant change carrying on by the absorbents; the fluid, or matter in contact with them, cannot be of so putrefactive, or dissolvent a quality, as if the bone was confined in any putrid inanimate mass. What gives weight to this opinion, is, that I do not recollect to have met with fœtor, about any of the small bones, which, though extremely numerous, I have extracted in cases of Necrosis; nor do I recollect, to have found the matter, issuing from such wounds, where they have been kept clean, more putrid than that from common wounds; or to have tinged a silver probe of a dark hue, as is common in some cases of other affections of the bones. I have observed, indeed, where large pieces of the cylinder of the Tibia have been detached, that a putrid sanies has often been collected about them; but this, I apprehend, has arisen from the difficulty, in such cases, of keeping the matter from being confined within the crevices of the bone. After writing these observations on the want of fœtor in these cases, I was pleased to find that Mr. Russel has noticed the same thing.

truth of what is advanced in the preceding pages on this subject. Besides, in this particular case, all the bones which came out of their own accord, and likewise, those which were extracted by the forceps, amounting in all to the number of about twenty-five, were parts of the Tibia, in the small of the leg, not exceeding a space of about five inches in length. (See Fig. 4). It is evident too, that their detachment from the original bone took place at the commencement of the disease, and as many of them are an inch long, it is not possible that they could have been much larger than they now are, when first detached from the living bone; for had that been the case, they could not have been parts of so small an extent of the Tibia. I ought to have mentioned, that I had much difficulty in extracting the largest piece. It was so strongly and completely

wedged in by the surrounding new cylinder, that it was impossible to bring it away, without cutting off a portion of the new bone, or breaking the former into pieces. In consequence of the hardness and probable thickness of the new cylinder, I determined, first, to try the latter method; as this bone could be readily laid hold of by the forceps, and moved upwards and downwards in its bony case. By forcibly twisting the forceps, I soon succeeded in breaking off two or three small fragments from it; after which, I extracted the large piece by moving it in different directions, while I had hold of it with the forceps. In three months from the time I first saw this patient, all his wounds were perfectly cured, and they have remained so for more than five years. He is a printer by trade, and now a fine young man, twenty-six years old. I saw him a

few days since, in order to have a drawing taken of his leg, and was surprised to find, that he continued, by choice, to wear a long roller from the knee to the toes; but he informed me, that without it, his leg would still swell, from standing so long at his business.

In this case, the Necrosis was confined to the lower half of the Tibia. The upper half, is in its natural undeformed state; never having had an ulcer upon it: but the lower half, from a little below the calf, gradually thickens, having more and more of the clumsy appearance, until it forms the inner ancle, where it is more prominent than at any other part. The whole of this part of the bone, is therefore evidently composed of the new cylinder; and at about the middle of the Tibia, where it is cemented to the old bone, it gradually loses this clumsy thickness. This curious case

may now be seen by any person: many others, also, of a similar kind, have come under my inspection. It is another proof of what I have before advanced, that Necrosis does not, in every case, destroy the whole of the old Tibia; and that at the place where this destructive inflammation terminates, the new and old bones can be as nicely united, while the extremities of them are in a pulpy and soft state, as the two ends of a fractured bone.

CASE 2.

Elizabeth King, No. 31, Red Cross Street, Union Street, Borough, aged thirteen years and a half, having had no previous fever, or indisposition of any kind, was seized in August 1807, with violent pain in the right leg, extending in the course of the Tibia, from

the knee to the foot. It swelled and inflamed the same day; she passed a very bad night; and the following day, all these symptoms were much more violent. In about ten days, suppuration took place; the abscess situated about the middle of the Tibia, was immediately opened, and about a quarter of a pint of matter discharged. Even after this, the pain, inflammation, and swelling, continued very violent, and a large quantity of matter was daily discharged. She continued nearly in this state about a month longer, when the violence of these symptoms in some degree abated. During all this time she was confined entirely to her bed, and had very little remission from pain night or day. Soon after this period, another abscess formed in the course of the Tibia, at some distance from the former, which burst, and discharged a large

quantity of matter. She was confined to her bed for three months longer, during which time three more abscesses formed along the Tibia; two of which were opened, and the other burst. These abscesses were situated in different parts of the leg, from a little below the knee nearly to the inner ancle. All the violent symptoms now gradually abated, and in a short time the common integument, covering the Tibia at its upper part, ulcerated away; by which a considerable portion of that bone became exposed. About two months afterwards, being about six from the attack, the girl was in a very deplorable situation; being extremely weak and emaciated, unable to put her foot to the ground, and walking with great difficulty with the assistance of crutches. Almost the entire cylinder of the Tibia, to the extent of four or five inches from the knee,

became elevated from its natural situation; apparently by the pressure of the new cylinder on its posterior and lateral sides, which daily increased in hardness. At this period she was advised by a surgeon of eminence, to have her leg amputated, but to this she would not consent. Six months after this, I saw her. She was then nearly in the situation I have just described, but the Tibia had become still more elevated, especially, at its upper part, and so much so, that nearly one half of the entire substance of it, could be taken hold of by a finger and thumb. The elevation of the bone above the skin, was so great, that I attempted to divide it with a common saw, and without wounding the skin, penetrated to some depth; after this, I endeavoured to break it, but this could not be effected. I then determined on its extraction by a pair of strong

forceps, as these could readily be applied without any previous removal of the new bone or integument. The bone appeared to be strongly confined; by using, however, some force, I could perceive, that it was loose, and on extracting forcibly, and yet slowly, (fearing least a large blood vessel might be lacerated) I got it out in a few minutes. It was seven inches and a half in length, and its upper part, was a portion of the entire cylinder of the Tibia. The saw had penetrated to the depth of three quarters of an inch through this part. (See Fig. 2. *b.*) The patient lost by this operation about four ounces of blood; and the cavity left by the extraction of the bone was extremely large. An amendment in every respect soon followed, but several lesser pieces of bone were afterwards extracted. She gradually recovered her health, and the use of her limb; and in a few months laid

aside her crutches. Her constitution however, was weakly and scrophulous: There were also several other ulcers in different parts of her leg, from whence the other bones were extracted. These, at times, as well as the large wound, ulcerated, and spread wider. But as her circumstances did not admit of a removal into the country, nearly two years elapsed, before she was completely cured. A long time, however, before a complete cure took place, she had the perfect use of her leg, and she is now quite well, and very stout and strong.

In this case, the whole of the Tibia was destroyed by the inflammation.

CASE 3.

George Watson, aged fourteen years and a half, No. 3, Dove Court, Leather Lane, having had no previous fever or

indisposition whatever, nor any hurt, was seized in November 1807, with violent pain over the whole of his left leg and foot. The day following the attack, the leg was extremely swelled and inflamed; attended with the most excruciating pain; he had also a violent fever and delirium. In the course of a week, all these symptoms had increased to a great degree, his leg being swelled to an enormous size. At the end of another week, a large abscess formed, a little above the middle of the Tibia, which was opened, and discharged about a quart of bloody pus. The violence of the pain then abated. Within a month from this period, several smaller abscesses formed, and burst at different times in the course of the Tibia, from a little below the knee to the ancle; at many of these places, the surface of the Tibia, became by degrees bare and

visible to the naked eye, to a considerable extent; and a large portion of the bone appeared to be raised up out of its natural situation. For about the space of six weeks more, that is, to the end of three months from the attack, he continued for the most part in the same state, excepting, that some abatement from pain gradually took place. At the end of six months, the ulcers and exposed part of the Tibia, remained nearly the same. At this period, such was the violence of the complaint, that he was confined entirely to his bed, and had been so, from the commencement of the attack. He was then advised by an eminent surgeon, to lose his limb; to which he would not consent. At the end of twelve months from the attack, a few pieces of bone came out from some of the wounds, after which, he began with great difficulty to walk about occasionally

with crutches, but was still unable to set his foot to the ground. He was also restless in the night, and often without sleep. Two months after this, I saw him, and found several large pieces of the Tibia in some degree loose; but apparently jammed in by the new formed bone. The largest of these was a portion of the upper part of the Tibia. It was somewhat elevated from its situation, and was without a covering of integument, or of the new formed bone, for several inches in length. To this piece, I applied a pair of strong forceps, and readily extracted it. It was a portion of the external and internal sides of the Tibia, of five inches and half in length. (See Fig. 3. *d*.) By the same means I extracted at different times afterwards, from the other wounds, twenty other pieces of the Tibia. From the time of the extraction of the large piece, he began

to regain his health and strength, and in a short time laid aside his crutches, and could walk very well. After all the bones were taken out, some of the wounds healed up; but others at times ulcerated, and would not cicatrize. He is of a weakly and scrophulous habit, yet he would probably have been soon well, if he had been able to go to the sea side, or into any part of the country; but his circumstances and engagements prevented this. One or two of the ulcers, are, I believe, still not cicatrized; he is, however, able to walk about as usual, and to perform all his engagements in business.

In this case too, the entire cylinder of the Tibia, from epiphisis to epiphisis, was destroyed by the inflammation; but as the new cylinder had not formed around the large portion of the Tibia first extracted, the leg at this part, has

much less of the thick clumsy appearance than is common in most other cases; and there is a considerable dent, or hollow, in the upper part of it, from whence the large bone was extracted. (See Fig. 3.)

Since the above was written, I have seen this young man, and was pleased to find, that he had been able to go into the country, by which his wounds were soon completely healed.

CASE 4.

Martha Herbert, aged twelve years and a half, from Burnham, Buckinghamshire; not having had her menses, and without having had any previous fever, was seized in March 1809, with a violent pain over the whole of the right leg; which she had strained a little the preceding day. A swelling immediately came on, and the following day, it was in-

flamed. All these symptoms continued to increase for three weeks. She had no intermission of pain night or day, and was entirely confined to her bed. At this period, a large suppuration appeared on the lower part of the Tibia, which burst a little above the inner ancle, discharging about a pint of pus. After this, she became a little easier. At the end of another month, a second abscess burst in the course of the Tibia; and five more in the space of nine months afterwards; all of which were situated in different places along the Tibia. At the end of six months from the attack, a piece of bone, about an inch long, came away from one of the ulcers; and about six months after this, two smaller bits. It may here be proper to remark, that the patient was confined to her room for the first three months of the disease, and entirely to her bed, for the first month of

this period. The remaining time she sat up during the day, with her leg on a pillow; the violent pain having much abated, although her leg was still very much swelled. After this, she began to walk with crutches, which she used for twelve months. At the expiration of two years from the attack of this complaint, I first saw her. A piece of the Tibia, apparently of some length, and a little elevated from its situation, could be seen in the abscess which last burst. The upper part of this piece, could be readily taken hold of by a pair of forceps, it being uncovered by integument. As this bone was evidently somewhat loose, I endeavoured to extract it by the forceps; a piece of it, however, broke off, leaving the remainder in its situation. It was then my intention to have taken an early opportunity to extract the latter piece; but the patient

soon afterwards lost her health, and an ulceration, and considerable spreading of one of the sores on her leg, attended with pain, fever, &c. took place to a considerable extent. This made it imprudent to perform any operation; she afterwards returned to Burnham, and was placed under the care of Mr. Robarts, Surgeon, of that place. Mr. Robarts informs me, that he soon removed all the untoward symptoms, by proper medicines and applications to her leg; but at the same time sensibly remarks in his letter, "that her recovery is, perhaps, more "to be attributed to country air." This accords exactly with my own ideas, as she resided in a very close place in town, and had before been always accustomed to live in the country. Some time after her recovery, Mr. Robarts found that portion of bone, from which I had broken the piece in endeavouring to take

it out, loose. This, with great judgment he extracted; and in another letter observes, "I laid hold of it with the "forceps, and by firmly pulling upwards "drew it out." This piece is more than four inches long, and is a strong shell of the internal and external sides of the Tibia, forming the spine of this bone. (See Fig. 8.) After the removal of this piece, the girl's leg greatly improved. Some smaller pieces afterwards came out, and, I believe, she is now perfectly well.

In this case likewise, the whole of the Tibia was destroyed by the inflammation.

CASE 5.

William Wright, aged eight years and a half, No. 8, Vere Street, Clare Market, (having had no previous fever) ran against a milkman's pail in the street, one night

in April 1810; this gave him some pain, and caused him to walk home with a little limp, but produced no wound. The next day, when at school, he was seized with a violent pain along the Tibia of the same leg, and was obliged to be carried home. In the course of the evening, the leg swelled and inflamed, and he had a very bad night. The day following, all these symptoms became much worse, and kept increasing for a fortnight, till at length his leg became three times its natural size. During all this time, he was in constant pain, night and day, and unable to get out of bed. He lost his appetite, was very feverish, and at times delirious. Matter had now formed a little below the middle of the Tibia, which was let out by a lancet, and about a pint discharged. After this, he became easier. In about five weeks afterwards, another abscess formed, and burst

about an inch and a half below the former. The first wound was, at this time, nearly healed; a small quantity of matter only being discharged from it. Shortly after this, a small bit of bone came out from one of these wounds. About a year and a half after this, another abscess burst on the Tibia, five inches below the knee, and about three inches distant from the first abscess. In two days afterwards, another burst, about an inch higher than the last. A small quantity of matter only was discharged from each of these abscesses. From the commencement of the attack, he was confined altogether to his bed for eight weeks; after which, he began to walk with crutches. These he used for twelve months, and then one crutch only for twelve months longer. About three quarters of a year after the first attack, another small bit of bone came out from one of the ulcers. In the course

of two years and a half afterwards, or in about four years from the first attack, between forty and fifty other small pieces worked out from the different wounds; as he would not suffer any attempt to be made to extract them. All the ulcers, except one near to the first abscess, are now healed. This is very small, and is prevented from healing, by a small bit of bone, which has been confined in this part nearly five years; the patient not permitting it to be extracted. In other respects he is perfectly well.

In this case, the upper part of the Tibia, from the knee to the place where the two upper little abcesses appeared, (a distance of five inches) is perfectly sound; having never been destroyed by the inflammation; but from this part to the ancle, a new cylinder is formed; which gives the leg the clumsy appearance, usually met with in similar cases.

This, as in many others, which I have seen, has taken place to a greater degree around the inner ancle, than in any other part. (See Fig. 6.)

About three weeks after the first attack on the Tibia, a swelling, attended with some pain, appeared on the femur, about four inches below the great trochanter. In about a fortnight after its appearance, a blister was applied. The swelling however increased; but it was not attended with any violent pain. An abscess formed, which burst in two or three days after the blister was applied. Two other abscesses have since burst, within a few inches of the first. From these, about ten bits of bone have worked out; the last of which came out at the end of four years from the attack. More still remain, which are attended with oozing wounds; but he will not suffer them to be taken out. On examination,

this affection proves to be a Necrosis of that part of the femur adjoining to the abscesses. A new cylinder is formed around this part, which may be distinctly felt by the fingers; but the lower part of the femur, to the extent of ten inches upwards from the knee, is not affected by the disease, and retains its natural size and shape.

CASE 6.

John Duckworth, aged eleven years, Cockfoster, near Barnet, was kicked in the shin by a boy, in 1810, which brought on a blackness in the skin. About a fortnight afterwards, he strained the ancle of the same leg, which occasioned great pain, and prevented his sleeping during the first night. In three or four days, he was confined to the house; and afterwards entirely to his

bed. The pain, inflammation, and swelling, gradually increased, particularly at the lower part of his leg, and in a fortnight, a large suppuration took place on the lower part of the Tibia. This was opened just above the inner ancle, and about a quart of matter discharged. The next day, another opening was made about two inches above the outer ancle. In about two months afterwards, an abscess burst, in the line of the Tibia, about three inches above the first opening. At different periods, within twelve months from the first attack, seven other abscesses burst in different places in the course of the Tibia, from the lowest abscess to within five inches of the knee; after which, the pain by degrees left him. He was confined to his bed about three months, and then began gradually to recover his strength; in two months more he was able to go out, and

soon recovered a good use of his leg. In about six months from the attack, a small bit of bone came out from one of the wounds, and after this, about twenty other pieces; but most of these were small, the largest of them being only an inch in length. The last of these came out about three years after the first attack of the complaint. When I first saw him, nearly four years from the commencement of this disease, he was in good health, and had the perfect use of his limb. The general appearance of the leg, was similar to most others which I have seen. The upper part of the Tibia, for about three inches from the knee, was not destroyed by the inflammation, but the remaining part to the ancle, has the usual clumsy appearance; and in this space there were three ulcers, two of which were very large. These had continued stationary

for a long time, without shewing any tendency to cicatrize, although there was no appearance of any loose bone remaining to obstruct it. As he was constantly employed in daily labour, I judged the impediment to healing, arose from his not having a roller and proper dressings. He was therefore ordered to use one, and to apply to the wounds frequently, the saturnine wash, already described, as the sores had a scrophulous appearance. By following this plan, the sores immediately put on a better appearance, and lessened at least one half in size in the course of six weeks. He is still under my care, as the sores are not yet perfectly healed; which probably, arises in part, from the distance of his residence, and the consequent infrequency of my seeing him.

In this case, even with the advantage of country air, the wounds shewed no

disposition to cicatrize, without the use of a roller, and proper dressings. For the space of two years before I saw this patient, he was employed in daily labour from morning till night; during this long period, the ulcers remained stationary, and were very large and painful. After I saw him, he continued in the same employment, walking and standing, for the most part, all the day. The bandage however, was no sooner employed, than cicatrization began to take place, and he is now nearly well without using any other remedy, excepting the saturnine wash already mentioned; which without the bandage, would have had very little effect.

CASE 7.

George Price, aged eight years and a half, No. 7, Hewit's Court, near St. Martin's Lane, but now at Mrs. Scott's, bottom of Stable Yard Street, Greenwich; was seized in January 1811, with a violent pain about the ancle, and along the Tibia of one of his legs. This increased to an alarming degree, attended with inflammation, by which he was entirely deprived of sleep. In about three weeks from the commencement of the attack, an abscess formed on the Tibia, about five inches above the inner ancle. This burst, and discharged about two table spoonfuls of matter. In a month afterwards, two smaller abscesses burst a little lower than the first. In the course of a week, another burst still nearer the ancle. In five months afterwards, three or four more abscesses ap-

peared, extending from about four inches below the knee to the first ulcer. He was confined to his bed for the first two months, during which time, he suffered almost constant pain, especially in the lower part of his leg, which was principally attacked by this disease. After this he sat up in his room daily for another month; and was then just able to walk about with the assistance of a stick. About four months after the attack, a small bit of bone came out from one of the wounds, and at different periods, for more than twelve months afterwards, about twenty other small pieces worked out from the different wounds; the largest of which did not exceed the size of a horse bean. A very thin shell, however, about an inch and a half long, being an external lamina of the bone, came out from one of the ulcers in the upper part of the Tibia. I saw him first about a year

and a half from the attack of his complaint; at which time, three ulcers remained unhealed; but it did not appear that any loose bones were concealed within them. I ordered the saturnine wash, already mentioned, to be frequently applied to his leg, on doubled cloths wetted in it, to which was added, the uniform and gentle pressure of a flannel roller, from the toes to the knee; very soon after which, he walked better, and without the use of any other remedy, was perfectly cured in four months.

In this case, the lower part of the leg is deformed by the new cylinder; but the upper part, to the distance of four inches from the knee, retains its natural shape and appearance. The speedy cure of the ulcers may also in this case, as in the last, be attributed principally to the use of the roller. This adds another proof to the many I have already given in a former

treatise,* that wounds and ulcers on the legs, will be as speedily cured, (and much more likely to remain well) if the patient take his usual exercise, than if confined altogether to his bed or sopha; provided compresses and a bandage be applied in a proper manner, aided by suitable dressings. As some confirmation of the truth of this assertion, I may observe, that this patient walked about almost the whole of every day before he applied the bandage; during which time the ulcers remained quite stationary; as soon however, as he applied the roller to his leg, a great amendment took place, and although his exercise was even greater than before, he was soon cured.

* See Practical Observations on the Treatment of Wounds and Ulcers on the Legs, without Rest.

CASE 8.

Jane Corfield, aged thirteen years and a quarter, No. 13, Carturton Street, Fitzroy Square, having had no previous illness of any kind, was siezed in May 1811, with excruciating pain in her left leg. A swelling and inflammation soon afterwards appeared, and on the third day, the whole leg and foot, from the knee to the toes, were extremely enlarged and inflamed. From this time she was confined entirely to her bed, where she remained eight weeks, being at times delirious, having no appetite, and but little sleep. All these symptoms continued daily to increase for a month, when a very large abscess appeared about the middle of the Tibia, which burst and discharged about two quarts of pus. About a fortnight afterwards, another large abscess burst in a different part. In

three or four weeks more, a third, and after this a fourth and fifth burst; the whole of which were in the course of the Tibia, from a little below the knee, to the ancle. By rest and time, with the use of emollient applications, &c. all the violent symptoms were considerably abated; but she was extremely reduced in strength. At the end of four months from the commencement of the attack, a small piece of bone worked out, but it was not more than half an inch in length. Since which time, six or seven other bits have come away from the different wounds. About ten months from the attack I first saw her, at which time she was obliged to walk with crutches. The whole leg, from the knee to the ancle, was swelled, clumsy and irregular in its shape, and somewhat inflamed. The old Tibia appeared to have been entirely destroyed and absorbed; and a new cylin-

der formed over it. Most of the abscesses and ulcers were perfectly cicatrized; two small ulcers only remaining open, one of which was situated on the lower part of the Tibia; the other on the fibula, a little above the outer ancle. These were evidently kept open by small bits of bone, which yet remained. The ulcer on the fibula communicated by a sinus, with the side of the Tibia adjoining to it. By the equal pressure of a flannel roller, applied from the toes to the knee, with the aid of compresses dipt in the saturnine wash; this young person soon recovered the perfect use of her leg, and laid aside her crutches, although these small pieces of bone remained in the wounds. The last time I saw her, one of these bits had worked out, and the ulcer was healed; but the other, attended with a very small wound, still remained in its situation; nor would she suffer it to be extracted. It is

remarkable, that in this case, all the symptoms were as violent, and the quantity of matter discharged on the bursting of the first abscess, as great, or even greater, than in any case I have before seen. The mother of the child indeed stated the first discharge, to be three or four quarts: I have, however, considered it as amounting to no more than two. I should observe also, that the bones detached from the Tibia, though numerous, were smaller than any, which I have before seen in similar cases; the whole not weighing more than twenty grains. See Fig. 1. *a. a.*

This is an additional confirmation, of the truth of what is advanced in the preceding essay, respecting the almost entire absorption of the old Tibia in some cases, while in others, a very large portion of it is cut off from the circulation, and becomes an extraneous body.

CASE 9.

John Wheeler, aged ten years and a half, Hanger Hill, near Ealing, Middlesex, fell down in the morning of the 3d of December, 1812, and in the evening, was attacked with great pain in his right knee, which continued for three or four days. The pain then left his knee, and seized his leg in a most violent manner. This continuing night and day, deprived him of sleep, and confined him to bed. A swelling, with inflammation, commenced the day after the pain had seized him, and extended from the knee to the toes. The swelling increased daily, and likewise the inflammation. In three weeks, matter formed on the upper part of the Tibia, a little below the knee; about a pint of which was discharged, merely by touching the part with a probe. The day following, an abscess burst on the

lower part of the Tibia, a little above the ancle. A sinus also appeared to run from the upper wound, about half way down the Tibia. At different times, five or six other abscesses burst in the course of the Tibia, which discharged large quantities of matter. During the first month the patient was so ill as to be thought in danger. Without laudanum he had no sleep in the night. His appetite likewise was very bad; and he was confined altogether to his bed. He was also so weak and low, that he nearly fainted when raised up in bed. His leg was of a larger size than that of an adult. At the end of a month, he began, although very slowly, to recover. For four or five months he sat up in his room daily; after which, he was carried often into the air, and began to use crutches. About two months from the commencement of the disease, a piece of bone worked out of

one of the wounds. Since which, about twenty-six other pieces have spontaneously come out; but none of them were larger than a horse-bean. I saw him about eight months after the attack, at which time he was unable to walk without crutches. He had then seven ulcers in different parts of the Tibia, between the upper and lower ones; and loose bones were supposed to be at the bottom of each wound. As he was weakly, and of a scrophulous habit, the saturnine wash was applied frequently to his leg, as a dressing, and a flannel roller was lightly applied from the toes to the knee. By this plan, he greatly improved in walking, even before any of the bones were taken out, and he soon laid aside his crutches. No time was however lost in extracting the bones, as he could bear the attempt; but temporary inflammations, of the erisipelatous

kind, to which he is very subject, attended with an enlargement of the sores, have obliged me at those times to suspend all operations, and to apply poultices to his leg. These, with the distance of his residence, have caused considerable delay in his cure, and many bones still remain unextracted. Besides which, many of them lie so deep, and are so closely wedged in by the new cylinder, or are surrounded by it, that it may perhaps be still necessary to cut away a portion of the new bone, in order to set them at liberty. He is however so much improved, that he can walk three or four miles without any inconvenience.

In this case, the entire Tibia was destroyed by the inflammation.

CASE 10.

Mary Hayward, aged twelve years, No. 3, Short's Yard, Lambeth Butts, near the Church, was seized in August 1813, (having had no previous illness) with pain about the outer ancle of her left leg. The day after, a swelling appeared, which extended from the ancle to the knee; this was followed, in two days, by external inflammation. These symptoms rapidly increased; and the limb became very large. The pain was violent in the night; but she got up in the day time, and was carried down stairs, and kept her leg in a chair. In a fortnight, matter formed; and the abscess burst, at the lower part of the Tibia, discharging about a quart of pus. The wound was dressed twice a day; and poured out each time about a tea-cup full of matter. In

seven weeks from the bursting of this abscess, another broke on the upper part of the Tibia, about four inches below the knee. In the course of a month after this, four other abscesses burst in different parts, between the upper and lower wounds; and another, between the tendo Achillis, and the outer ancle, within two inches of the heel. From the first abscess, three bits of bone have worked out; the largest of which is about half an inch in length. After the bursting of this abscess, the pain nearly ceased; but three months elapsed, before she could walk, or bear her leg to touch the ground. This patient had been thirteen weeks in a public institution, where she received benefit. When she first applied to me, she could not walk without the assistance of a stick, and there were eight ulcers in different parts of the leg; in all of which were detached pieces of

bone. I immediately extracted three or four of them. As the sores, however, were sometimes in a painful and spreading state, I ordered her to apply an emollient poultice, and a flannel roller; by the use of which, her leg was much improved. After this, she used the saturnine wash three times a day, and the roller a little tighter than before. By following this plan, she laid aside her crutches in the course of a fortnight, and many of the wounds were soon healed. Twelve other bones have been since extracted; five of which are an inch in length. She is still under my care. Six of the ulcers are completely healed; the two others are very small, and would soon be well, if she would suffer the bones to be extracted. She can, however, walk extremely well, and has the perfect use of her leg.

In this case, the Necrosis extended from the ancle, to within about two inches of the knee; leaving this small portion of the old bone undestroyed by the inflammation.

As a distinction of age is of importance in discriminating the two diseases which are the subjects of this essay, I shall extract the list of ages from my former publication on the Affection of the Tibia after Fever, and make such additions to it as have since occurred; contrasting this, with a list of ages, from the cases of Necrosis related in the present essay.

The following is a copy of the ages of the patients, in twenty-two cases of the Affection of the Tibia after Fever, extracted from the former essay.

Of the age of 14	1
——— 18	1
——— 19	1
Between 20 and 30	7
——— 30 and 40	11
——— 40 and 50	1
	22

In addition to this list, six cases of this complaint have since occurred in my own practice; one of them is now under cure, and applied to me while these papers were in the press. Of these, the following is an account.

Between 30 and 40	5
Of the age of 14	1
	6

The cases of Necrosis, related in this essay, are ten; of these, the ages of the patients are as follows:

Between 8 and 10	2
——— 10 and 12	3
——— 12 and 14	3
——— 14 and 15	2
	10

EXPLANATION OF THE PLATE.

Fig. 1. represents the leg of Jane Corfield, at that period of the disease when many of the ulcers were healed, but three or four of them in the small of the leg still remained open. It is at this part that the clumsy appearance is more particularly discernable. All the upper part of the leg, is however, very different, both in size and shape, from the other leg, and the enlargement made by the new bone may be very distinctly felt.

a a ten small bones which came out from different parts of the leg. See Case 8.

Fig. 2. represents the leg of Elizabeth King, at that period of the disease when all the ulcers were nearly

healed. The long scar shews the place from whence the adjoining large portion of the Tibia was taken. The clumsy appearance of this leg needs no explanation.

b the large portion of the Tibia, taken from the same patient by the forceps. It measured seven inches and a half in length. A little above the middle of the bone, is represented the furrow made by the saw, in attempting to cut it asunder before its extraction: it is an inch in depth, or nearly half way through the bone. This was done, without wounding the adjoining skin on either side, when the bone was raised above its natural situation, by the pressure of the new cylinder.

c c three large pieces of bone taken from other parts of the leg. See Case 2.

Fig. 3. represents the leg of George Watson. The drawing of this was likewise taken when the cure was nearly completed. Some of the ulcers, however, in the small of the leg still remained open. The clumsy appearance of this leg also is sufficiently apparent without explanation.

d a large piece of the Tibia, five inches and a half in length, and at the upper part one inch in width. It was taken out by forceps, from the place represented as a scar at the upper part of the leg.

e e twelve bones, of different sizes, taken from ulcers in different parts of the leg. See Case 3.

Fig. 4. represents the leg of Alexander Mackintosh. The drawing of this, was taken many years after the cure was completed. In the small of the

leg, seven or eight marks are represented, which are intended to shew the scars which remain. In consequence of the continual use of the roller, and the number of years, which have elapsed, since the cure was completed, the clumsy appearance in this part is not now so visible as before; but it may be distinctly felt by the fingers. The original Tibia in all the upper part of the leg retains its natural size and shape; having never been affected by Necrosis.

ff seven bones, of different sizes, taken from wounds in the small of the leg, within the compass of five inches. The three largest of these, are more than an inch in length, and had remained in the wounds, as extraneous bodies, about six years, before they were extracted. See Case 1.

Fig. 5. represents the leg of Mary Hayward, now under cure. The drawing was taken when eight ulcers remained open in different parts of the leg, occasioned by loose bones within them. As the whole Tibia in this case was destroyed, except about two inches from the knee, the clumsy shape is visible in every part. See Case 10.

Fig. 6. represents the leg of William Wright; in which all the ulcers are healed, except one in the small of the leg, in which a small bit of bone still remains. The clumsy appearance is chiefly visible in the lower part of the leg; but may also be distinctly felt in the middle part, as far as the scars extend. But in the upper part, for about five inches from the knee, the Tibia preserves

its natural shape and appearance. See Case 5.

Fig. 7. represents a very thin shell of two sides of the external laminæ of the Tibia, with its spine. It was taken from a case of Necrosis, and measures five inches and a half in length.

Fig. 8. represents another thin shell of the external laminæ of the Tibia, with its spine, taken out in another case of Necrosis. This piece measures four inches.

h h three small pieces of bone extracted from a wound in this case, adjoining to that from which the above bone was taken.

Fig. 9. represents almost the entire half of the jaw bone of a girl, between

five and six years old; taken out by the mouth, in a case of Necrosis. Some particulars of this case are given in a marginal note at page 23.

Fig. 10. represents almost the entire radius of a child, about six years old, taken from the arm in a case of Necrosis. The bone is almost perfect at one end, and through its whole length; but there is a little erosion at the other extremity. Another bone was formed previous to its extraction. Some particulars of this case are likewise given in a note at page 23.

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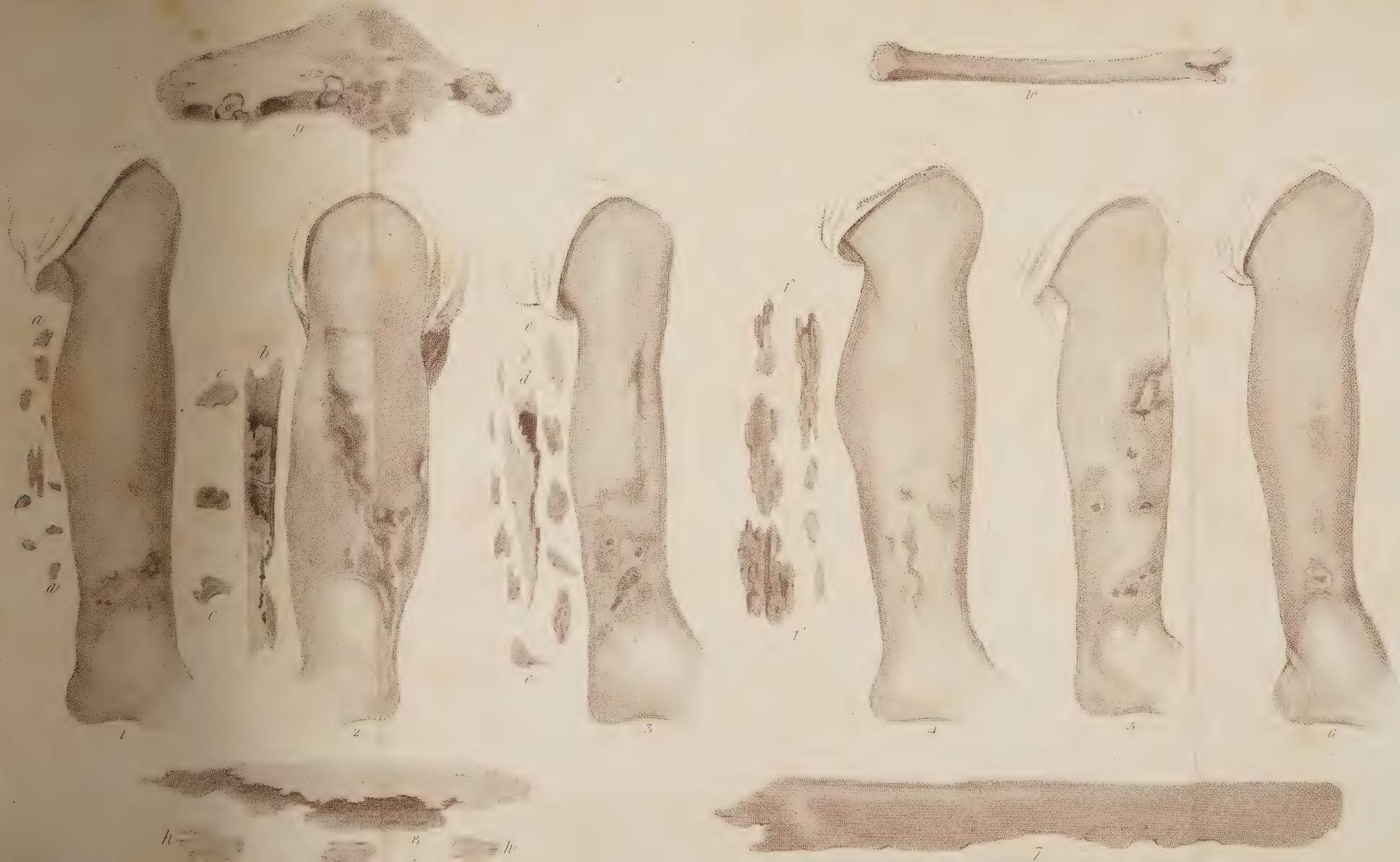
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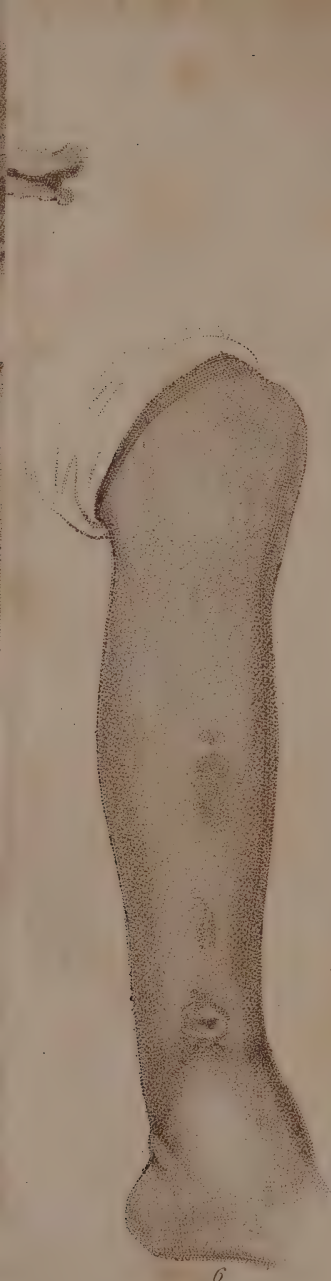
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